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EXAMINER

VU, QUANG D

ART UNIT PAPER NUMBER

2811

DATE MAILED: 01/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/039,615

Applicant(s)

WALLACE, ROBERT F.

Examiner

Quang D Vu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 09/08/03.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5,6 and 12-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5,6 and 12-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 16 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,399,421 to Han et al.

Regarding claim 16, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and a second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die positioned such that the die bond pads of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surfaces of the die attach pad (59);

a contact lead (62) positioned proximate to the first (42) and second (50) die;

a first gold bonding wire (40) that is stitch bonded to the contact lead (62) and stitch bonded to the die bond pad (48) of the first die (42), wherein the first gold bonding wire (40) was stitch bonded to the contact lead (62) after being stitch bonded to the die bond pad (48);

a second gold bonding wire (40) that is stitch bonded to the contact lead (62) and stitch bonded to the die bond pad (58) of the second (50) die, wherein the second gold bonding wire

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(40) was stitch bonded to the contact lead (62) after being stitch bonded to the die bond pad (58); and

a molding cap (66) that encapsulated the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact lead (62).

The claim limitations “the first aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad and the second aluminum bonding wire was stitch bonded to the contact lead before being stitch bonded to the die bond pad” in claim 16 are taken to be product by process limitations which do not carry weight in claim drawn to structure. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 277 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

Regarding claim 19, Han et al. teach the first die contains integrated circuit components configured to form a memory or a logic unit (column 1, lines 26-29).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al.

Regarding claim 1, Han et al. (figure 3) teach a molded semiconductor device package comprising:

a die attach pad (59);

a first (42) and second (50) semiconductor die, each die having a die bond pad (48, 58), each of the die positioned such that the die bond pads (48, 58) of each die face in opposite directions, the first (42) and second (50) die being connected to opposing surfaces of the die attach pad (59);

a plurality of contact leads (62) positioned proximate to the first (42) and second (50) die;

a first bonding wire (40) that is stitch bonded to the die bond pad (48) of the first die (42) and stitch bonded to a first one of the contact leads;

a second bonding wire (40) that is stitch bonded to the die bond pad (58) of the second die (50) and stitch bonded to a second one of the contact leads; and

a molding cap (66) that encapsulates the first (42) and second (50) die, the first and second bonding wire (40), and a portion of the contact leads (62).

Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter because it reduces the thickness of the device. Furthermore, it has been held

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that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 5, Han et al. teach the first and second bonding wire (40) are formed of a material selected from gold (column 4, lines 41-42).

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. in view of US Patent No. 5,735,030 to Orcutt.

Regarding claim 2, the disclosures of Han et al. are discussed as applied to claims 1 and 5 above.

Han et al. differ from the claimed invention by not showing a first conductive ball formation that is formed between the first bonding wire and the die bond pad of the first die; and a second conductive ball formation that is formed between the second bonding wire and the die bond pad of the second die. However, Orcutt (figure 3) teaches a conductive ball formation (21) that is formed between the bonding wire (1) and the die bond pad (5) of the die (7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Orcutt into the device taught by Han et al. because it is desirable securely to hold the wire on the chip. The combined device shows a first conductive ball formation that is formed between the first bonding wire and the die bond pad of the first die; and a second conductive ball formation that is formed between the second bonding wire and the die bond pad of the second die.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 6, the disclosures of Han et al. are discussed as applied to claims 1 and 5 above.

Han et al. differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

7. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,399,421 to Han et al. in view of US Patent No. 5,735,030 to Orcutt.

Regarding claim 12, Han et al. (figures 1-3) teach a molded semiconductor device package comprising:

a pair of semiconductor dice (42, 50) that are oriented such that a top surface of each die are facing in opposite directions, the top surface of each die having at least one die bond pad (48, 58);

at least one contact lead (62) positioned proximate to the pair of semiconductor dice (42, 50);

a molding cap (66) that encapsulated the pair of semiconductor dice (42, 50), the bonding wire (40) and a portion of the contact lead (62).

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Han et al. differ from the claimed invention by not showing a conductive ball formation positioned on the die bond pad of each die and at least one bonding wire that is stitch bonded to the contact lead and stitch bonded to one of the conductive ball formations on the die bond pad. However, Orcutt (figure 1) teaches a conductive ball (21) formation that is formed on the die pad (5) and the bonding wire (1) is also stitch bonded to the contact lead (9) and stitch bonded to the conductive ball formation (21) on the die bond pad (5). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Orcutt into the device taught by Han et al. because it is desirable securely to hold the wire on the chip and the lead. The combined device shows a conductive ball formation positioned on the die bond pad of each die and at least one bonding wire that is stitch bonded to the contact lead and stitch bonded to one of the conductive ball formations on the die bond pad.

Regarding claim 13, Han et al. teach a die attach pad (59) that is attached to and sandwiched between the pair of semiconductor dice (42, 50).

Regarding claim 14, Han et al. teach the bonding wire (40) is gold. (column 4, lines 41-42).

Regarding claim 15, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter because it reduces the thickness of the device. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

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8. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,399,421 to Han et al. in view of US Patent No. 6,437,429 to Su et al.

Regarding claim 17, Han et al. differ from the claimed invention by not showing the package is either a thin small outline package or a quad flat pack package. However, Su et al. teach the package is a thin small outline package or a quad flat pack package (column 1, lines 13-20). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Su et al. into the device taught by Han et al., since it is a conventional semiconductor device package.

9. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,399,421 to Han et al.

Regarding claim 18, Han et al. differ from the claimed invention by not showing the molding cap has a thickness of less than about 1 millimeter. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the molding cap has a thickness of less than about 1 millimeter because it reduces the thickness of the device. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Response to Arguments

Applicant's arguments filed 03/25/03 have been fully considered but they are not persuasive.

As explained in the office action, the term “stitch bonded” recites product-by-process limitation, which does not carry any patentable weights. In any event, Han et al.’s lack of disclosure suggest to the ordinary artisan that any well known bonding technique can be used in the invention including “stitch” bonding.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Eddie Lee can be reached on 703-308-1690. The fax phone numbers for the

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organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv
January 21, 2004



EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800